The Music of Enterprise Integration

Everyone can relate to **music** in some way. You don't have to be a musician to appreciate music. While music may differ by generation and culture, we all know the difference between music and noise. Music, like many other arts and sciences, is based on mathematics. And like math, it is a form of language with its own lexicon and notation.

For all these reasons we chose to use music as an analogy for explaining the role of the Army Enterprise Integration Oversight Office (AEIOO). We're also using one film clip, about five minutes long, to help demonstrate the analogy. The clip is Walt Disney's Fantasia.

Fantasia is the 1940's animated film set to classical music. While it's often thought of as a children's movie, it is quite a powerful film for adults as well. Leopold Stokowski directs the Philadelphia Orchestra in eight classical pieces and there's a cameo appearance of Walt Disney himself. We'll use the beginning of the movie, which shows an orchestra pit slowly filling with musicians.

Now let's make music.

There are numerous agents of musical art, but it all starts with the **composer**. The composer is the one who conceives the musical idea and expresses it in musical notation. He creates and authors the music. He may or may not play the music, or even a musical instrument. He writes the music down using standard musical notation and conventions recognizable to musicians everywhere. The term "music" applies to both the written form (a piece of music) and what we hear. Music is music. But the music comes to life only when it is translated from the musical symbols on paper to physical sounds, through the artistry of **performers.**

Originally, composers wrote music by hand on staved paper, paper that is printed with the musical staff. Today, there are computer-generated ways to write music, but many composers continue to write by hand. They generally start with the **melody** of the piece and then continue to enhance the piece with the **harmony**. Melody is a logical succession of tones; it's the tune you carry around in your head or whistle. The melody may be played by a single instrument, on a single staff throughout the piece, or more typically, it moves from one staff to another, one instrument to another. The other staves and instruments harmonize the melody. The entire set of music for all instruments and staves is called a **score**. Scoring is the art of orchestration, of composing or arranging for an **orchestra**.

A piece may be purchased and played in the form in which the composer scored it or it may be altered in what's called an arrangement. Purchased **sheet music** from a music publishing house is generally arranged by a professional **arranger**. Musicians may be familiar with several arrangements of the same piece of music.

The arrangements may vary in their difficulty, the instruments for which they were transcribed, or their harmonization. Certain keys (the primary tone center and scale) are easier to play on different instruments and audiences will generally be familiar with the most popularly played arrangement. Music can also be arranged on the fly by the ensemble playing the music.

There are many forms of music and many sizes of ensembles of performers that play music. Chamber music, from the baroque period (1600 to 1750) and 18th century was written for small ensembles. The smallest piece and number of performers is one, the solo for the **soloist**. Musical lexicon is in Italian, and musical terms, regardless of composer or performer, are Italian. After the solo we have duets for duos, then trios, quartets, quintets and so on. An orchestra is a large group of instruments, generally with more than one player for each instrument or part of the music. Music for orchestras is more modern music, from the 19th century to today. A large orchestra is called a symphony orchestra and consists of more than 100 players (generally around 125 players). The largest number of players in a symphony orchestra is practically infinite, although a huge number would be unmanageable.

The orchestra is led by a **conductor**. Conducting is communication, through gesturing, to interpret the composer's piece to a group of performance artists (musicians). The conductor is responsible for setting the rate of speed for each piece and for guiding any necessary deviations from it. He regulates dynamics, determines the balance between the various sections, cues players into the piece, and determines phrasing. The conductor may also prepare formal (printed) arrangements of composer's pieces. The conductor has the full score to the music so he his aware of all the large concepts and delicate nuances of the music, for each musical instrument. He convinces the orchestra that his interpretation of the music is the way everyone should play it. He is the leader. The British term for conductor is in fact, "leader."

The **concertmaster** is the conductor's right hand man. He is generally the first violinist – first chair - of an orchestra. The concertmaster plays the occasional solo passages for violin in orchestral music, and unless overruled by the conductor, is responsible for the bowings of the other violinists in his section. Modern ensembles, especially chamber groups of less than ten, rarely have a conductor. In these groups the concertmaster doubles as the leader, although he may neither have the full score nor lead by gesturing. Conductors and chamber groups may make modifications to the written music for the purpose of simplifying the music, making it more interesting, shortening it, removing an instrument, or any of a myriad of reasons. Unlike printed sheet music, these modifications and impromptu arrangements are generally useful only for that particular group or performance. They will not be universally known or understood.

In order to literally get everyone on the same sheet of music, the conductor uses a score to lead the orchestra. Every score has a melody, which is the basis of musical composition. In addition to melody, which can be defined as a logical succession of tones, other major musical concepts include **rhythm** and harmony. Rhythm is an essential property of melody. It divides musical ideas into "sentences" of regular metrical portions and brings fluidity and movement to the music. Rhythm is related to the musical notations of measures, meters, and time, all of which organize or divide a piece horizontally. Melody is said to move horizontally through a piece and melodies within the melody are called **themes**.

In contrast, harmony moves vertically within a piece. Harmony is the art of combining sounds into chords and then treating those chords according to certain musical rules. Pieces can consist of just melody, but to our ears those sound thin, "monophonic," meaning lacking in harmony. We expect melody to unfold against a harmonic background. The relationship of harmony and melody is called texture. Many western pieces are homophonic, meaning there's a single melody with subordinate harmony. A complex and ripe textured piece is full of harmony. It is rich and sonorous.

This is the end of our abbreviated musical introduction. It's time to demonstrate how music is an apt analogy for enterprise integration.

The music of an organization is called the **enterprise**. While it's possible to subdivide an enterprise into sub-enterprises, just as melody can be divided into themes, the enterprise is the enterprise as viewed from the top. It's the CEO's perspective we call the enterprise.

The CEO is the conductor of the enterprise. He leads the enterprise and interprets the plans and strategies to guide the organization. His score is called the **enterprise architecture**. The enterprise architecture enables the CEO to see all the **architectures** of the enterprise and their relationships to one another. Each individual operating unit within the enterprise has an architecture, which is equivalent to one of the staffs on the score of the enterprise architecture.

The enterprise architecture, and each of the individual operating unit architectures, is composed of three architecture **blueprints**. The primary blueprint is the operational architecture, which documents the functional operations of the organization. The technical architecture describes the organizations information infrastructure, or infostructure. The systems architecture describes information technology systems that support the organization's operations.

In today's environment it is possible to buy commercial off-the-shelf (COTS) systems rather than developing your own. COTS systems that provide end-to-end support for the organization's operations are called **Enterprise Planning Systems (ERP)**. The advantage of buying ERPs is that they come with up to 30

years of embedded best “business” practices. They are fully integrated and take advantage of the latest in technology standards. The vendor provides technology refresh, which the enterprise can guarantee to its **users** if they don’t modify and customize the system. ERPS are like sheet music, where the vendor has done the composing and standardized the arrangement for the organization.

The users, who are the performers in the music of the enterprise, must be the composers for their operational architectures. The efficiency and effectiveness of their operations may suffer if they don’t document their operations. The composition and arrangement of their architectures needs to be accomplished routinely and in a rigorous fashion. If there is no architecture, if it is not kept current, or if it is documented on the fly, it is likely the vision and operation of the enterprise will be sub optimized. It will be impossible to integrate the enterprise if there are no blueprints from which to work.

From a domain or operating unit perspective, their operational architecture is preeminent. From this viewpoint they are soloists playing the melody. Multiply the number of domains in the operation by this viewpoint and you end up with competing soloists and melodies. In the absence of an integrated enterprise architecture, there will be many melodies but no harmony. Domains will not necessarily integrate, support, or harmonize with other domains within the enterprise.

The absence of architectures is further exacerbated by the absence of a recognizable science for architecture and systems development. Common and standard methodologies, tools (instruments), roles, and notations simply don’t exist. Anyone can be the composer or the arranger – or no one can. The issue is further bifurcated by the existence of multiple architectural blueprints, especially the separate operational and system architectures. The bottom line is that the **business rules** of the enterprise either are not documented, are not known or understood – especially by top management, or are changed by almost anyone in the organization, or are so static they have not kept up with the vision of the enterprise.

In the **Army** it is especially important that we align our melody with our harmony and integrate our Institutional and Operational, sustaining and tactical processes and systems. The warfighter has to be considered the melody and all the supporting business processes must provide the harmony. This harmonization must also take place between business processes and systems, to create an integrated enterprise and achieve a family or system of systems.

The Secretary of the Army has identified the **Army Enterprise Integration Oversight Office (AEIOO) as his concertmaster** for enterprise integration. The **Secretary of the Army is the leader**, the conductor of this vast enterprise is known as the Army. For the purposes of integrating the architectures and business systems, however, **the AEIOO is leading the charge**. Part of that

charge includes using COTS systems and adopting ERPs with their embedded best business practices unchanged. Staff, secretariat, MACOM – *all* - organizations that perceive a need to modify an ERP must bring that request to the Secretary for his decision to allow the modification. In other words, the goal is to transform the organization, not the software, and if that can't be accomplished, the Secretary will have visibility into those areas that are having difficulty effecting transformation.

In achieving enterprise integration the AEIOO has started by overseeing the integration of operational architectures and the ERP system blueprints of the numerous initiatives and programs throughout the Army and DoD. Key among these is the Business Management Modernization Program, formerly known as the Financial Management Modernization Program, and DMHRS. The recently delivered logistics enterprise integration study, once validated by the functional and technical communities, may well form a cornerstone of both the enterprise architecture and an enterprise integration strategy.

Musicians are lucky. Music moves in time, not space. Musicians get to rehearse before they have to play before a live audience. If they perform well they receive immediate feedback when the audience claps, performs a standing ovation, or demands an encore. In the symphony of the Army we don't have the luxury of rehearsal before going to war, training notwithstanding. No one claps at the end of our performance. We really only get one chance to get it right, which is why Army enterprise integration is so important.

Some of the musical conventions and their AIOO correlations are:

• Composer	architect
• Conductor	leader
• Arranger	ERP vendor
• Soloist	a domain or system
• Sheet music	blueprint, architecture
• Score	enterprise architecture
• Musician	user, domain (functional area)
• Melody	one system, one domain
• Harmony	family of systems, integrated domains
• First Chair/concert master	AEIOO, integrator
• Symphony orchestra	the Army
• Performers	users
• Music	enterprise
• Musical notation	business rules